

Supplementary Material 1.

1. Please select the screw insertion method performed at your hospital (multiple selection allowed)?

- ① Open free hand screw (Free hand)
- ② Open C-arm guide screw (Open)
- ③ Percutaneous pedicle screw (PPS)
- ④ Navigation guide screw (Navi)
- ⑤ Robot guide screw (Robot)

2. Please select the number of screw insertion and assist occurrences at your hospital.

	Screw insertion	Assist
Free hand		
Open		
PPS		
Navi		
Robot		

None: 0 case, Low: 1–10 cases, Medium: 10–30 cases, High: > 30 cases.

Please provide the number of screw insertions and assists per case, rather than the number of individual screws.

3. In the following case, please prioritize and indicate the preferred screw insertion methods by numbering them 1, 2, 3, 4, 5.

(1: most preferred, 5: less preferred)

	1–2 Level TLIF/PLIF	1–2 Level OLIF	Multilevel fusion	Revision
Free hand				
Open				
PPS				
Navi				
Robot				

4. Please prioritize the methods based on their perceived advantages in each case. (1: most advantageous, 5: least advantageous)

	FH	Open	PPS	Navi	Robot
Operation time					
Bleeding amount					
During screw insertion					
Accuracy					
Learning curve					
Radiation exposed					
Recovery time					

5. How well do you know about robot-guided MIS percutaneous screw fixation?

- ① I am very familiar with it.
- ② I attended in cadaver workshop.
- ③ I have heard of it.
- ④ I do not know what it is.

6. What level of interest do you have in robot-guided MIS percutaneous screw fixation?

- ① Very interested.
- ② Interested.
- ③ Some level of interested.
- ④ Not interested.
- ⑤ Not interested at all.

7. The following questions are designed to assess your existing knowledge of robot-guided MIS percutaneous screw fixation. There are no right or wrong answers. Please mark an "O" for the statements you believe to be true.

- ① Robot-assisted surgery allows for significantly shorter surgical times compared to conventional surgery. (O/X)
- ② Robot-assisted surgery results in significantly reduced radiation exposure for the surgeon compared to conventional surgery. (O/X)
- ③ Preoperative registration for robot-assisted surgery can be achieved solely using the O-arm. (O/X)
- ④ The most time is consumed in Robot assisted surgery is (registration/screw planning/screw insertion).
- ⑤ The accuracy of robot-assisted surgery is typically at or below 95%. (O/X)
- ⑥ The accuracy of robot-assisted surgery is significantly superior to the conventional C-arm guided screw technique. (O/X)
- ⑦ Robot-assisted surgery is more effective in (multi-segment/single-segment) surgeries.
- ⑧ The accuracy in robot-assisted surgery decreases significantly in patients with deformities. (O/X)
- ⑨ Robot-assisted surgery is significantly superior to navigation-guided screw techniques. (O/X)

8. Do you believe that training in robot-guided MIS percutaneous screw fixation is necessary?

- ① Absolutely.
- ② Yes.
- ③ Somewhat.
- ④ No.
- ⑤ Not at all.

9. Do you think robot-guided MIS percutaneous screw fixation will become mainstream in the future?

- ① Absolutely.
- ② Yes.
- ③ Somewhat.
- ④ No.
- ⑤ Not at all.

10. If you have the opportunity to train in robot-guided MIS percutaneous screw fixation, would you be willing to participate?

- ① Absolutely.
- ② Yes.
- ③ Somewhat.
- ④ No.
- ⑤ Not at all.